

## Pre-Conference Workshop on MATLAB & Simulink Applications in Engineering

### Event Details:

1. **Date & Time: 18<sup>th</sup> Feb. 2021, 10 am to 5 pm**
2. **Supplementary Materials/ Study Kit:**  
Lecture Slides, Study Material (Tutorials), and Exercise Sheets, e-Books on MATLAB & Simulink
3. **Expert Profile:**

**Dr. R. N. Patel (Ph. D. -IIT Delhi)**

Sr. Member- IEEE, Member Execom (IEEE Bombay Section)

Ex-Faculty- SSTC Bhilai, IIT Rookee, BITS Pilani

Associate Professor, Deptt. of Electrical Engg., NIT Raipur

**Author: 'Programming in MATLAB- A Problem Solving Approach', PEARSON**

### Workshop on MATLAB & Simulink Applications in Engineering

| Session            | Tentative Timings            | Brief Topics   |
|--------------------|------------------------------|--|
| Session- 1         | 10:00 AM-<br>11:30 AM        | Introduction to MATLAB, Matrices and their Applications, MATLAB Graphics and Plotting, MATLAB Programming, debugging MATLAB programs and handling errors |
| Session- 2         | 11:40 AM –<br>1:20 PM        | Loops and Conditional Statements, Writing MATLAB Functions, Important MATLAB Functions and Common Engineering Applications                               |
| <b>Lunch break</b> | <b>1:20 PM -<br/>2:00 PM</b> |  |
| Session- 3         | 2:00 PM -<br>3:30 PM         | Simulink Modeling and Introduction to Important Toolboxes, Demo Models on Simulink for Various Engineering Problems                                      |
| Session- 4         | 3:40 PM -<br>5:00 PM         | Graphical User Interface (GUI) in MATLAB, Writing Code for GUIs, Using MATLAB GUIs for Problem-Solving   |

## Session Details

### Session 1:

Introduction to MATLAB desktop, using MATLAB help, MATLAB demo programs, Matrices and their Operations, Application of Matrices in Problem Solving. Linear Plots, Plot Labeling and Annotation, Scaling the Plots, Special 2D and 3D plots, Curve fitting and Interpolation/ Extrapolation with MATLAB. Writing a MATLAB program, debugging MATLAB programs and handling errors.

### Session 2:

Conditional statements and loops, writing MATLAB functions with single and multiple arguments, variable number of inputs and outputs in functions, inline functions, and MATLAB inbuilt functions.

Application of MATLAB functions: Solving linear equations, Differentiation, integration and numerical solution to differential equations; ODE functions and their application in Engineering. Introduction to symbolic tools, Laplace transform, Pole-Zero plot, control systems applications: state space analysis, transient response: step and impulse, Bode plot, Root locus and Nyquist plots.

### Session 3:

Introduction to SIMULINK, making SIMULINK model for systems with differential/ algebraic equations, creating and masking sub-systems in SIMULINK, writing S-functions, working with important SIMULINK Blocksets and Toolboxes, Simulation of Electrical and Electronics Circuits and Systems with MATLAB/SIMULINK.

### Session 4:

Creating Graphical User Interface (GUI), writing code for GUI, linking m-file and SIMULINK model through GUI. Using MATLAB GUIs for Problem-Solving using: ANN, Fuzzy Logic, Genetic Algorithm and Other Optimization Algorithms.